WHAT IS CLAIMED IS:

1. A lithium secondary battery comprising a positive electrode, a negative electrode including a carbon material as an active material, and a nonaqueous electrolyte comprising a solute dissolved in a nonaqueous solvent in which γ-butyrolactone is the main solvent, wherein the carbon material has a ratio (I_D/I_G) of a Raman spectrum intensity (R) obtained by Raman spectroscopy of 0.2 or greater, and the nonaqueous electrolyte includes at least 0.1 part by weight of vinylene carbonate and at least 0.1 part by weight of vinyl ethylene carbonate in 100 parts by weight of the nonaqueous electrolyte.

2. The lithium secondary battery according to claim 1, wherein an amount of γ-butyrolactone in the nonaqueous solvent is not less than 90 % by volume.

3. The lithium secondary battery according to claim 1, wherein an amount of γ-butyrolactone in the nonaqueous solvent is not less than 95 % by volume.

4. The lithium secondary battery according to claim 1, wherein an amount of γ-butyrolactone in the nonaqueous solvent is not less than 97 % by volume.

5. The lithium secondary battery according to claim 1, wherein 0.1 ~ 3 parts by weight of vinylene carbonate and 0.1 ~ 8 parts by weight of vinyl ethylene carbonate are contained in the nonaqueous electrolyte.

6. The lithium secondary battery according to claim 2, wherein 0.1 ~ 3 parts by weight of vinylene carbonate and 0.1 ~ 8 parts by weight of vinyl ethylene carbonate are contained in the nonaqueous electrolyte.

7. The lithium secondary battery according to claim 1, wherein 5 % by volume of ethylene carbonate is contained in the nonaqueous electrolyte.

8. The lithium secondary battery according to claim 2, wherein 5 % by volume of ethylene carbonate is contained in the nonaqueous electrolyte.